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TITLE PAGE:

Title: The enigma of rotator cuff tears and the case for uncertainty

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It is suggested that tears of the rotator cuff (RC) are a significant cause of shoulder pain. Given that the rates of surgical repair have risen approximately 200% across Europe and the USA over recent years [1], it seems that many clinicians and patients accept this suggestion, yet there is a strong case to question it.

The prevalence of RC tears increases with age and asymptomatic RC tears are common in those over 50 years in the general population, with twice as many people showing evidence of RC tear ***without*** shoulder pain compared to those who show evidence of a RC tear ***with*** shoulder pain [2]. It therefore seems timely to recognise the enigma of the RC tear and make the case for uncertainty with regard to clinical decision-making. The legitimacy of this proposal becomes more apparent when it is recognised that approximately 40% of RC's re-tear or fail to heal following surgery but these patients report similar levels of pain and function as those patients whose RC is judged to be healed [3]. Considering that surgical intervention is largely justified through implication that the RC tear is the source of symptoms and therefore the tear should be repaired to improve symptoms, this is an interesting finding that challenges the assumed mechanism of action of surgery.

Clinically a distinction is made between type of RC tear; traumatic or non-traumatic and different treatment pathways are proposed in the current British Elbow & Shoulder Society and British Orthopaedic Association guidelines [4]. Traumatic RC tears are diagnosed when onset of shoulder pain can be attributed to a specific event thought to be sufficient to tear the RC, e.g. a fall or sudden awkward movement of the shoulder, and non-traumatic or degenerative RC tears where a specific cause cannot be identified [4]. Reflective of the research evidence, patients with shoulder pain attributed to non-traumatic tears typically undergo a programme of physiotherapist-led exercise initially, and surgery is only considered if this fails [4]. In contrast, current guidelines suggest that suspicion of a traumatic RC tear should be treated as a 'red flag' requiring urgent surgical opinion [4].

To date three RCTs (n = 252) comparing surgery to conservative treatment have been undertaken and synthesised in a systematic review [5]. The review concluded there is limited evidence that surgery is no more effective than conservative care for RC tear, regardless of origin. Hence the rise in surgical repairs has occurred without

evidence of comparative benefit. But, of the 252 patients included in the systematic review, only 40 (16%) were diagnosed with traumatic tears. So, there is a lack of evidence to support clinical decision-making.

Given this lack of evidence, the different pathways may have arisen, at least in part, due to the perception of greater certainty surrounding the diagnosis and cause of the traumatic tears. It is also suggested that delays to surgery result in greater technical challenges and that delay risks poorer clinical outcomes. However, several non-randomised studies evaluating the impact of time to surgery vary considerably with some recommending surgery within four months of symptom onset, some six months, and some 24 months, yet others conclude that time to surgery is not a critical factor [6]. Given that asymptomatic RC tears are increasingly common as we get older, it is also difficult to attribute tears of the RC to the recent trauma with complete confidence [2]. Imaging for shoulder pain following trauma might actually just be identifying an existing asymptomatic RC tear.

Furthermore, a cohort study of 1300 patients with traumatic (n = 811) and non-traumatic (n = 489) RC tears reported no difference in clinical outcomes according to the nature of onset which calls into question claims about certainty of diagnosis [7].

Another concern relates to increasing size of the RC tear if not operated on. Some tears do increase in size, with greatest rate of increase in those with full-thickness tears; observed in 82% versus 26% of those with partial-thickness tears [8]. But, it is also apparent that many RC tears do not progress over time and, importantly, these increases are not consistently associated with poorer outcomes of pain and function [8].

Thus, there is a body of research evidence that challenges the assumption that RC tears are a cause of shoulder pain and questions conventional clinical decision-making. It is clear that evidence underpinning current treatment pathways for traumatic tears needs strengthening. Given the lack of research evidence indicating superiority of surgery for traumatic RC tears as well as issues relating to surgical costs, risk and patient burden, it seems time to recognise the enigma of RC tears

and understand the case for uncertainty with regards to clinical management. High quality research is needed to more robustly inform clinical decision-making.

STATEMENTS

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